1. A student throws a Frisbee across Norlin quad. The function $s(t)$ gives the distance in yards the Frisbee has flown after t seconds.

t in seconds	0	2	4	6	8	10	12	14	16
$s(t)$ in yards	0	15	28	39	48	55	60	63	64

   (a) What is the average velocity of the Frisbee between $t = 2$ and $t = 10$ seconds? Include units.

   (b) Estimate the instantaneous velocity at $t = 14$ seconds. Include units.

   (c) Assume that $s'(8) = 4$. What does the value 4 represent in the context of the problem? Include units.

2. Evaluate the following limits. Show your work.

   (a) $\displaystyle\lim_{x\to 0} \frac{e^{2x}}{\cos(2x)}$

   (b) $\displaystyle\lim_{x\to 1} \frac{2-\sqrt{3+x}}{x-1}$

   (c) $\displaystyle\lim_{x\to 2} \frac{x^2-x-2}{x^2-2x}$

   (d) $\displaystyle\lim_{x\to 3} \frac{|x-3|}{x^2-9}$

3. Complete the definition of continuity.

   A function f is continuous at a number a if:

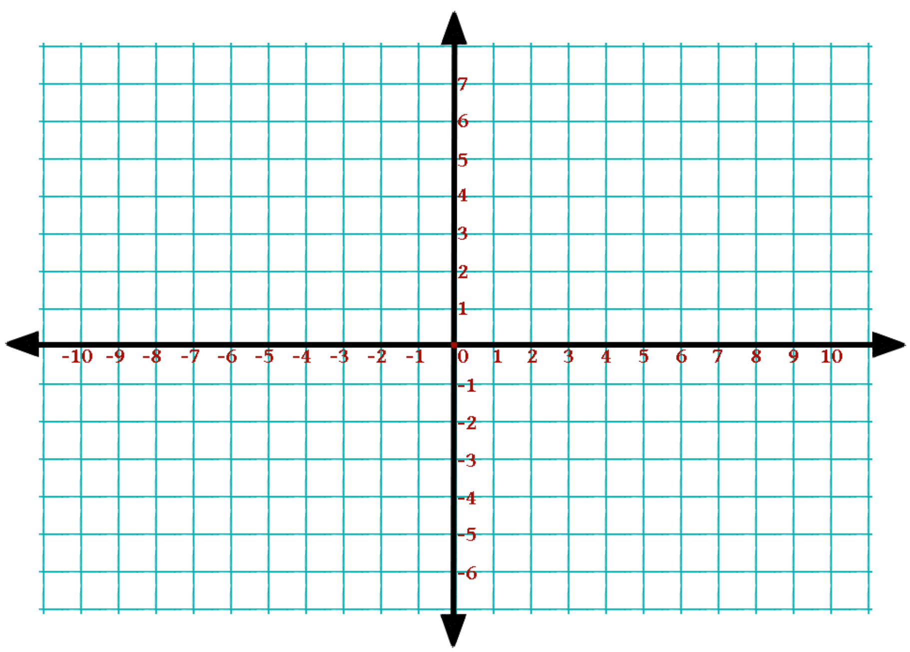
4. Consider the piece-wise function

$$f(x) = \begin{cases} e^{bx-3} & \text{,when } x < 1 \\ \ln(x)+1 & \text{,when } x \geq 1 \end{cases}$$

   Find the value of b that makes $f(x)$ continuous everywhere. Show your work.

5. Sketch the graph of a function $f(x)$ which satisfies ALL the conditions below.

- f has an infinite discontinuity at $x = -6$
- $\lim_{x\to -3} f(x) = -\infty$
- $\lim_{x\to 2^-} f(x) = 4$
- $\lim_{x\to 2^+} f(x) = -2$
- $f(2) = -2$
- $\lim_{x\to 4} f(x) = 1$
- f has a removable discontinuity at $x = 4$
- $\lim_{x\to \infty} f(x) = 2$



6. Evaluate the following limits.

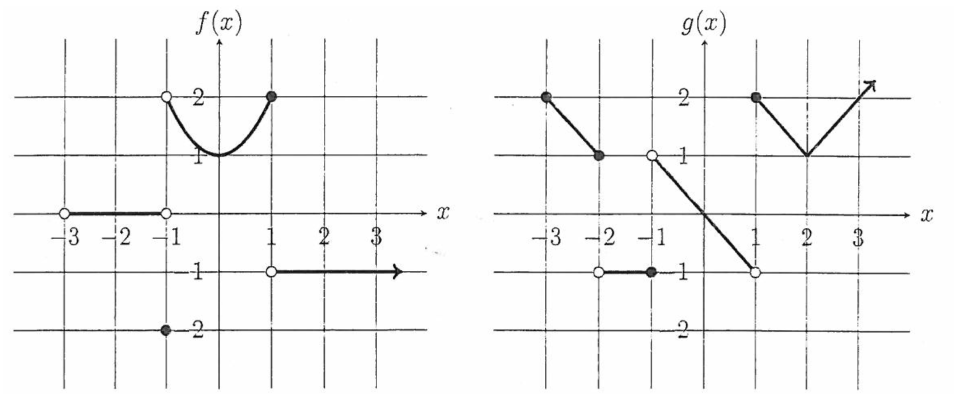
(a) $\displaystyle\lim_{x\to\infty} \frac{4t^2 - 3t + 2}{t^4 - 2t^2 + t - 5}$

(b) $\displaystyle\lim_{x\to -\infty} \frac{6x^3 + x^2 - 4x + 1}{3x^3 - 2x^2 + 5}$

(c) $\displaystyle\lim_{x\to 1^+} 2^{3/(x-1)}$

(d) $\displaystyle\lim_{x\to 2} \frac{x^2 + 2x - 4}{x - 2}$

7. The graphs of two piece-wise functions, $f(x)$ and $g(x)$, are shown below.



Evaluate the following limits.

(a) $\lim_{x\to 3} f(x)g(x)$

(b) $\lim_{x\to 1} f(x)+g(x)$

(c) $\lim_{x\to 2^-} \dfrac{f(x)}{g(x)}$

(d) $\lim_{x\to 2} f(g(x))$

8. Evaluate the following limit. Show all of your work. Be sure to cite any theorem(s) you use and justify why you can apply the theorem(s). $\lim_{x\to 3}(x-3)^2\cos(\dfrac{1}{x-3})$

9. Use the limit definition of derivative to compute

$$f'(1) \text{ if } f(x) = x^2 + x.$$

10. Use the Intermediate Value Theorem to show that the equation

$$x^3 + x^2 + x - 2 = 0$$

has a solution in the interval [0,1]. You must check that the hypotheses (conditions) of the Intermediate Value Theorem are satisfied before you may apply it.